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| EXAMINER | |
|---|---|
| ABRAHAM, ESAW T | |
| **ART UNIT** | **PAPER NUMBER** |
| 2133 | |

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| *Office Action Summary* | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/696,926 | NIEMINEN, ESKO | |
| | Examiner | Art Unit | |
| | Esaw T. Abraham | 2133 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3,8,10-12,17 and 19-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4-7, 9, 13-16 and 18* is/are allowed.

6)☒ Claim(s) *1-3,8,10-12,17 and 19-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## Response to Amendment

Applicant's argument, with respect to the rejection(s) of claim(s) 1-3, 8, 10-12, 17 and 19-29 under 35 U.S.C. 103(a) as being as being unpatentable over Wolf et al. (U.S. PN: 6,898,254) are persuasive. However, upon further consideration, a new ground(s) of rejection is made Wolf et al. (U.S. PN: 6,898,254) in view of Kanai et al. (U.S. 6,988,233).

### *Claim objections*

In view of the amendment filed on 05/30/06, the Examiner withdraws all objections to the claims.

### *Status of claims*

1. Claims **1-3, 8, 10-12 and 17** remain pending and New Claims 19-29 are presented for examination.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere* CO., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims **1-3, 8, 10-12, 17 and 19-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (U.S. PN: 6,898,254) in view of Kanai et al. (U.S. 6,988,233).

**As per claims 1, 10, 19, 23 and 28:**

Wolf et al. teach or disclose an error control systems in data transmission, especially to iterative decoding using parallel concatenated encoders, such as turbo decoders (see col.1, lines 11-15). Wolf teaches a stopping criterion has been developed for turbo decoding that measures the SNR of the extrinsic and compares the result to a threshold and if the threshold is reached, no further iterations are executed (see col. 6, lines 25-27). Further, Wolf et al. in figure 4 shows a block diagram of a stopping criterion implementation wherein the block diagram is broken into two regions (see col. 6, lines 52-58). Wolf disclosed quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at +m. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold

K. If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-67). It is noted however, Wolf **did not explicitly** detail the aspect of "determining whether the signal comprises a valid code or comprises only noise by the means for monitoring the decoder and means responsive to the monitored decoder" as recited in the instant claims 1 and 10. **However,** Kanai et al. in an analogous art, FIG. 4 teach a Turbo decoder (301) iterates error correcting decoding on the received coded sequences, and outputs decoded results to error checker (302) performs error detection on the decoded result (error detecting code) output from turbo decoder (301), thereby checks whether an error is contained in the decoded result, and outputs a check result signal (OK signal (valid code) or NG signal (noise) indicative of the check result to iteration controller 303. When determining there is an error, error checker (302) outputs a NG signal to iteration controller (303), while outputting an OK signal to iteration controller 303 when determining there is no error and further the Iteration controller (303) determines whether turbo decoder (301) continues or finishes the iteration decoding, and when finishing the iteration, controls turbo decoder 301 to finish the iteration decoding (see col. 6, lines 13-34). **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made to implement the method of detecting (monitoring) a Turbo decoder for determining a valid code (valid or OK signal) from a noise (negative or NG signal) as taught by Kanai et al. in the invention of Wolf et al. **This modification** would have been obvious because a person having ordinary skill in the art would have been motivated art would have been

motivated in order to secure desired transmission quality while decreasing processing delay (see col. 4, lines 5-7).

**As per claim 2:**

Most of the limitations of the claim have been noted in the rejection of claim 1. In addition, Wolf et al. in figure 3 teach a turbo decoder comprising two MAP decoders (308, 310).

**As per claim 3:**

Most of the limitations of the claim have been noted in the rejection of claim 1. In addition, Wolf et al. teach that quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at +m. An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate less certainty in the decoded values. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold K. If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-38). Further, Kanai et al. in FIG. 4 teach a Turbo decoder (301) iterates error correcting decoding on the received coded

sequences, and outputs decoded results to error checker (302) performs error detection on the decoded result (error detecting code) output from turbo decoder (301), thereby checks whether an error is contained in the decoded result, and outputs a check result signal (OK signal (valid code) or NG signal (noise) indicative of the check result to iteration controller 303. (see col. 6, lines 13-34).

**As per claim 8:**

Wolf et al. teach all the subject matter claimed in claim 1 but Wolf et al. do not explicitly detail that the decoder (turbo decoder) comprising a WCDMA UE. Nevertheless, as would have been well known (WCDMA UE are known in the art of turbo decoding systems since turbo codes are commonly (typically) used for error correction on the CDMA forward and backward links) to one ordinary skill in the art at the time the invention was made, such WDCDMA user equipment (a mobile station) are used to communicate with any one or more of a plurality of base station subsystems in a geographic region. Accordingly, it would have been obvious to one ordinary skill in the art to include user equipment because such equipment would have been required to communicate with a base station in the wireless communication systems.

**As per claim 11:**

Most of the limitations of the claim have been noted in the rejection of claim 10. In addition, Wolf et al. in figure 3 teach a turbo decoder comprising two MAP decoders (308, 310).

**As per claim 12:**

Most of the limitations of the claim have been noted in the rejection of claim 10. In addition, Wolf et al. teach that quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at +m. An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate less certainty in the decoded values. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold K. If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-38). Further, Kanai et al. in FIG. 4 teach a Turbo decoder (301) iterates error correcting decoding on the received coded sequences, and outputs decoded results to error checker (302) performs error detection on the decoded result (error detecting code) output from turbo decoder (301), thereby checks whether an error is contained in the decoded result, and outputs a check result signal (OK signal (valid code) or NG signal (noise) indicative of the check result to iteration controller 303. (see col. 6, lines 13-34).

**As per claim 17:**

Wolf et al. teach all the subject matter claimed in claim 10 but Wolf et al. do not explicitly detail that the decoder (turbo decoder) comprising a WCDMA UE. Nevertheless, as would have been well known (WCDMA UE are known in the art of turbo decoding systems since turbo codes are commonly (typically) used for error correction on the CDMA forward and backward links) to one ordinary skill in the art at the time the invention was made, such WDCDMA user equipment (a mobile station) are used to communicate with any one or more of a plurality of base station subsystems in a geographic region. Accordingly, it would have been obvious to one ordinary skill in the art to include user equipment because such equipment would have been required to communicate with a base station in the wireless communication systems.

**As per claims 20, 24 and 29:**

Most of the limitations of the claim have been noted in the rejection of claims 19, 23 and 28. In addition, Wolf et al. in figure 3 teach a turbo decoder comprising two MAP decoders (308, 310).

**As per claims 21-22 and 25-27:**

Most of the limitations of the claim have been noted in the rejection of claims 19, 23 and 28. In addition, Wolf et al. teach that quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at +m. An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate

less certainty in the decoded values. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold K. If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-38). Kanai et al. in FIG. 4 teach a Turbo decoder (301) iterates error correcting decoding on the received coded sequences, and outputs decoded results to error checker (302) performs error detection on the decoded result (error detecting code) output from turbo decoder (301), thereby checks whether an error is contained in the decoded result, and outputs a check result signal (OK signal (valid code) or NG signal (noise) indicative of the check result to iteration controller 303 (see col. 6, lines 13-34).

***Examiner's statement for reason for allowance***

3. Claims **4-7, 9, 13-16 and 18** have been allowed.

The following is an examiner's statement for allowance:

The prior art of record Wolf et al. teach or disclose an error control systems in data transmission, especially to iterative decoding using parallel concatenated encoders, such as turbo decoders (see col.1, lines 11-15). Wolf teaches a stopping criterion has been developed for turbo decoding that measures the SNR of the extrinsic and compares the result to a threshold and if the threshold is reached, no further

iterations are executed (see col. 6, lines 25-27). Kanai et al. in an analogous art, FIG. 4 teach a Turbo decoder (301) iterates error correcting decoding on the received coded sequences, and outputs decoded results to error checker (302) performs error detection on the decoded result (error detecting code) output from turbo decoder (301), thereby checks whether an error is contained in the decoded result, and outputs a check result signal (OK signal (valid code) or NG signal (noise) indicative of the check result to iteration controller 303. When determining there is an error, error checker (302) outputs a NG signal to iteration controller (303), while outputting an OK signal to iteration controller 303 when determining there is no error and further the Iteration controller (303) determines whether turbo decoder (301) continues or finishes the iteration decoding, and when finishing the iteration, controls turbo decoder 301 to finish the iteration decoding (see col. 6, lines 13-34). However, the prior art taken singly or in combination fail to teach, anticipate, suggest, or render obvious a detector that considers at least one inequality where 1) $SE_AEB(L)$ less than or equal to const1 X SEAEB(1); 2) SEAEB(L) less than or equal to const2 X S; 3) SEA(L) less than or equal to const3 X S; 4) SEB(L) less than or equal to const3 X S; 5) EA(L) less than or equal to const4 X EA(1); 6) EB(L) less than or equal to const4 X EB(1); 7) EAEB(L) less than or equal to const4 X EAEB(1); 8) EA(L) less than or equal to consts5 X S; and 9) EB(L) less than or equal to const5 X S; where L represents the number of a last turbo decoder round, where < represents "less than or equal to", where X represents times (multiplication), and where const represents a constant value, where if any one of inequalities are found to be true, then it is determined that the received signal does not

comprise a valid turbo coded code word, and where SEAEs(n) denotes a sum of absolute values of soft values after an $n^{th}$ turbo round, EAEB(n) denotes a sum of absolute values of sums of extrinsic values of A-parities and extrinsic values of B-parities after an $n^{th}$ turbo round, EA(n) denotes a sum of absolute values of extrinsic values of A-parities after the $n^{th}$ turbo round; EB(n) denotes a sum of absolute values of extrinsic values of B-parities after the $n^{th}$ turbo round; SEA(n) denotes a sum of absolute values of sums of systematic samples and extrinsic values of A-parities after the n turbo round, SEn(n) denotes a sum of absolute values of sums of systematic samples and extrinsic values of B-parities after the $n^{th}$ turbo round, and S denotes a sum of absolute values of systematic samples Therefore, claims 4 and 13 are allowable.

Claims **5-7, 9, 14-16 and 18,** which is/are directly or indirectly dependent/s of claim/s 4 and 13 are also allowable over the prior art of record.

**Conclusion**

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US PN: 5,938,790 Marrow, Marcus

US PN: 6,654,927 Sall et al.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Esaw Abraham whose telephone number is (571) 272-3812. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are successful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone numbers

for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for after final communications.

Information regarding the status of an Application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or PUBLIC PAIR. Status information for unpublished applications is available through Private Pair only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Esaw Abraham

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Art unit: 2133

GUY LAMARRE
PRIMARY EXAMINER